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Vol. VIII.

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EXPERIMENT STATIONS,

U. S. Department of Agriculture

U. S. Department of Agriculture

THE AGRICULTURAL STUDENT



J.S. MORRILL

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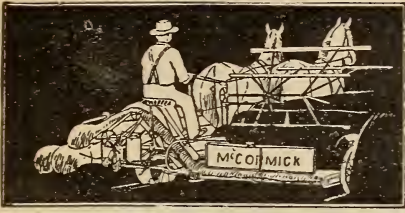


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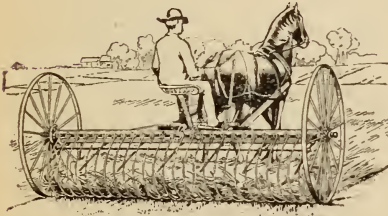
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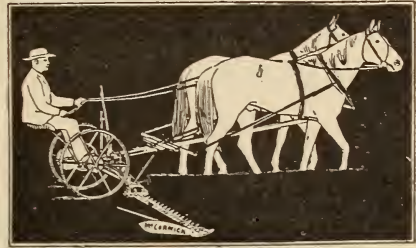
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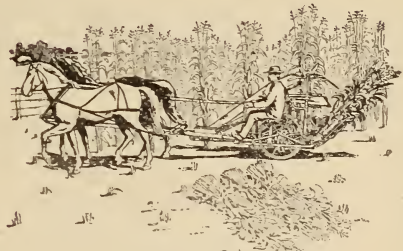
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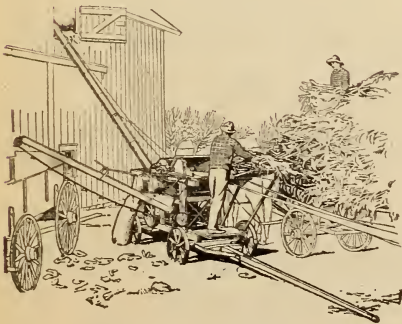
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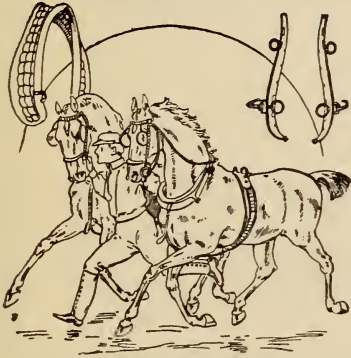
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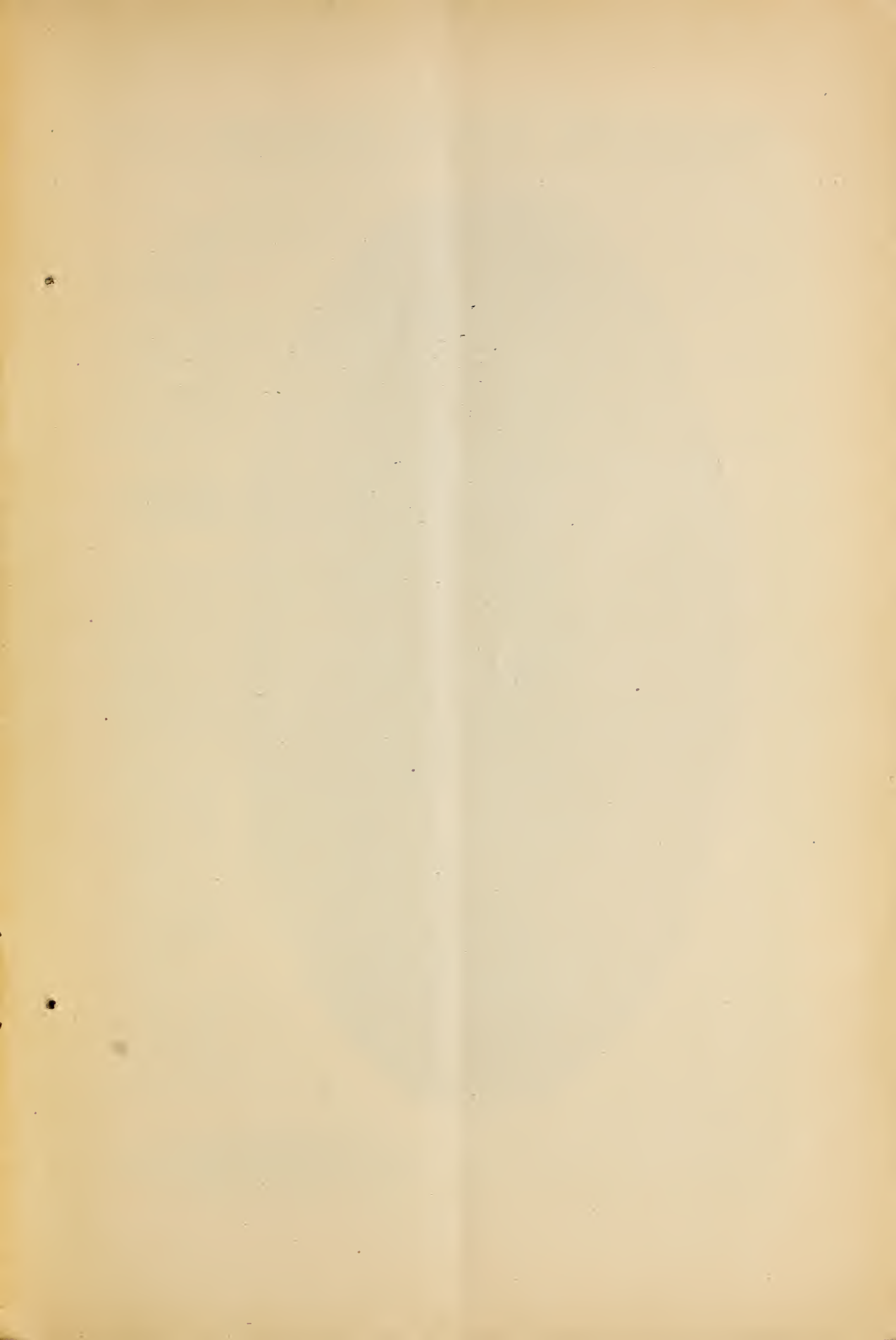
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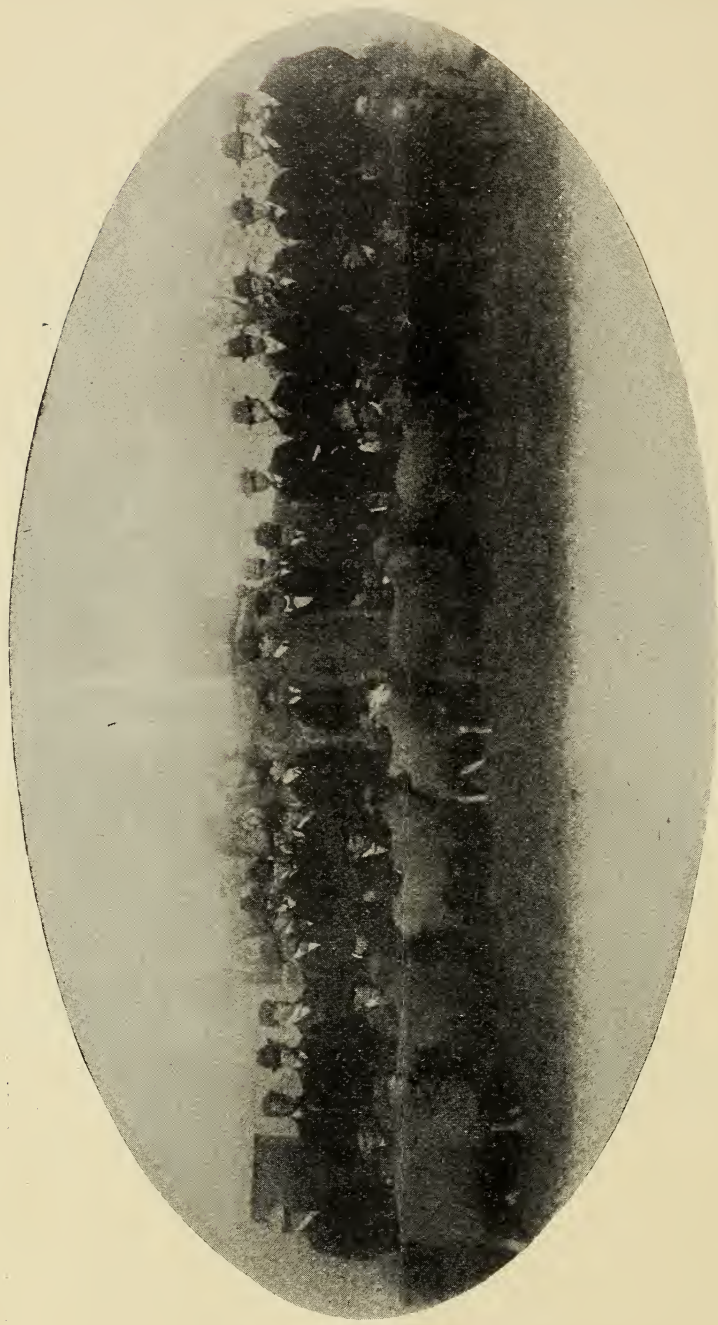
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Ohio State University.

THE AGRICULTURAL STUDENT.

VOL. VIII.

OHIO STATE UNIVERSITY, COLUMBUS, DECEMBER, 1901.

No. 4.

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EDITORIAL CHAT.

Country Life in America for November is a superb fulfillment, on the part of the publishers, of a promise to make a new sort of a magazine devoted to nature, country homes, gardening, and all things out-of-doors. The two leading articles are "The Abandoned Farms," a picturesque presentation of neglect; and "Ellerslie," ex-Governor Morton's handsome country seat, as representatives of the best ideals of country living. These present in a large way widely different rural conditions of the greatest human interest. Henry Troth and other well-known artist-photographers have furnished many large illustrations. Features more in the way of practical suggestion are a series of pictures, and a descriptive article, entitled, "Pleasant Homes and Gardens," "Shrubbery in the Home Grounds," by Samuel Parsons, Jr., the well-known landscape architect; and "The Home-Maker's Yard," by Frances Copley Seavey. "The Life Story of the Frog" is told by Mary Rogers Miller and illustrated by some thirty extraordinary photographs of live frogs and tadpoles by A. Radclyffe Dugmore. In "La Belle Fameuse," F. A. Waugh reads the folklore of the French Canadians in their famous domestic apple of

today and centuries past; while J. Horace McFarland tells what "American Apples" mean to our country. Writing editorially, Mr. L. H. Bailey tells what the magazine stands for as an exponent of the growing interest in nature and country living, and discusses significant evidences of this outdoor feeling. "Plant Growing in Garden and Field," is the title of a profusely illustrated department, treating of many subjects from bulbs for winter and spring bloom to growing chrysanthemums and freesias at home. In special appropriateness to the season are "Growing American Beauty Roses Under Glass," how to make "A Winter Pit," and "Protecting Plants for Winter"; and "How to Make a Garden—The First Lesson" is a significant feature. "Notes from Wood and Fallow" include a long article on "Goldenrod, Queen of the American Autumn," by W. W. Rowlee, with twelve hitherto unpublished drawings by William Hamilton Gibson, and "Woodchucks," by H. D. Reed, with a series of remarkable photographs of the little ground-hog" taken of him alive in the woods. A department of "Recent Writings" reviews outdoor books, a "Correspondents Corner" is an open court for subscribers to give and ask information, and "Doings of the Day" will take notice of events of outdoor interest.

The Division of Publications of the United States Department of Agriculture has recently sent out for publication a very complete review of the Annual Report of the Secretary of Agriculture for 1901, which will be found in part elsewhere in this issue. We regret that space will not permit its being published in full, for the review brings out the leading points of the report in a compact and a concise manner. Few of us realize the extent of the work, and the wonderful amount of good that is being

done by the Department. No other governmental department is doing more for the increased and lasting prosperity of the country, and the constantly increased favor with which the work is viewed by thinking and broad-minded statesmen augurs well for the future of the country. In other words, Agriculture is fast coming to be understood in its proper relation to other industries—the foundation upon which they all rest. No better educational work could be done by the Department than to place a copy of the report in the hands of every farmer in the land, for it cannot help but prove instructive and inspiring.

Professor Hunt delivered two addresses, one on "The Conformation of the Market Draft Horse," and the other on "The Breeder, the Feeder and the Showman," before the Illinois Live Stock Breeders' Association at their seventh annual meeting held in the Agricultural Building, University of Illinois, November 18-21, inclusive.

Professor Hunt was in Washington on business relative to the Department, November 25 and 26.

THE STUDENT wishes to acknowledge the receipt of the first number of the second volume of *The Ohio Naturalist*. The journal is the official organ of the Biological Club and has all nature for its field of work. The Board of Editors are specialists in their line of work and the magazine has been a success from the beginning, reflecting much credit upon the University as well as its promoters.

The American Association of Agricultural Colleges and Experiment Stations met in Washington, D. C., November 22 and 23, 1901. About one hundred and fifty delegates were present, including college presidents, professors and experiment station workers. The Ohio

State University was represented by President Thompson, Captain Cope and Professor Gibbs. In the election of officers for the ensuing year, President Thompson was elected First Vice President and Captain Cope a member of the executive committee.

Dr. A. C. True was elected as Dean of the Graduate Summer School in Agriculture, the first session of which is to be held at the Ohio State University in the summer of 1902.

The Washington Alumni of the University gave a banquet to the O. S. U. delegates. Twenty-five were present, sixteen of which were O. S. U. graduates.

Secretary Wilson gave a reception to the visiting delegates, which proved one of the most enjoyable features of the convention.

Faculty Resolutions in Honor of Professor Gibbs.

At the last meeting of the Faculty of the College of Agriculture and Domestic Science of the Ohio State University, the following resolution was unanimously adopted:

Whereas, Prof. William D. Gibbs has been connected with the College of Agriculture and Domestic Science of the Ohio State University for the past six years, first as Assistant Professor of Agriculture and later as Professor of Agronomy, and has distinguished himself in these positions as a scholar and teacher, always loyal to the best interests of the College and equally helpful in promoting these interests by cordial co-operation with the Faculty and student body; therefore,

Resolved, That this Faculty, while acquiescing in Professor Gibbs' acceptance of a professorship and directorship in the college of a sister State, place before record an expression of the high

value in which they have held his services and of the regret with which they witness his withdrawal from the University, and that each and every member join in wishing Professor Gibbs and his estimable wife a long, happy and successful career in their newly-chosen field of labor.

Townshend Chapter of Alpha Zeta fraternity gave a dinner at the University Café in honor of Professor Gibbs, who will leave for Durham, New Hampshire, the beginning of the year.

Professor Decker presided at the head of the table in his usual affable manner, and toasts were responded to by several members. Mr. Beal presented the professor with a beautiful cane and fraternity pennant in behalf of the Chapter.

Program of the Eleventh Annual Meeting of the Ohio State Academy of Science, Columbus, Nov. 29 and 30, 1901.

Friday, 9:45 A. M., Business Meeting
10:45 A. M., Reading of Papers.

1. New Fossils, including Sea- weeds, two new genera, Carboniferous, Marietta; Land Plants, two species, Carboniferous, one species, Corniferous; Corals, fifteen Cyathophylloids, Corniferous; Brachiopods, one, Corniferous; Cephalopods, six, Corniferous. 60 min.—H. Herzer.

2. Notes on the timber trees of Ohio. 10 min.—William R. Lazenby.

3. The self-pruning of woody plants. 6 min.—John H. Schaffner.

4. The Ohio species of Phyllochora. 5 min.—W. A. Kellerman and J. G. Sanders.

1:30 P. M.

President's Address—The Future of Vegetable Pathology—A. D. Selby.

5. A striking case of mimicry, with exhibition of specimens. 7 min.—Herbert Osborn.

6. Smut infection experiments. 10 min.—W. A. Kellerman and O. E. Jennings.

7. Further observations on the pre-glacial drainage of Wayne and adjacent counties. 10 min.—J. H. Todd.

8. The weight, waste and composition of apples. 10 min.—William R. Lazenby.

9. Plant ecology of Ohio; a general outline. 8 min.—John H. Schaffner and Fred J. Tyler.

10. Observations on the flora of the Gauley Mountains, West Virginia. 10 min.—W. A. Kellerman.

11. Preliminary list of tamarack bogs in Ohio. 8 min.—A. D. Selby.

12. Report for 1901 on the State Herbarium with additions to the Ohio Plant List. 6 min.—W. A. Kellerman.

7:30 P. M.

Joint meeting of the Academy of Science and the Modern Language Association of Ohio. Room 32, University Hall (Main Building), third floor (elevator).

13. Modern Languages and Science in High School Course—William Werthner.

14. Botanizing in Colorado Mountains. Illustrated—A. D. Selby.

15. Some notes on a trip to South-eastern Siberia—Gerard Fowke.
Saturday, 8:30 A. M., Business Meeting.

9 A. M., Reading of Papers.

16. Notes on Hemiptera, with some records of species new to the Ohio list. 5 min.—Herbert Osborn.

17. Observations on some South American Hemiptera, with exhibition of specimens. 5 min.—Herbert Osborn.

18. A species of Diptera mining the leaves of wild rice at Sandusky. 5 min.—James S. Hine.

19. Experiments with chemicals to improve seed germination. 5 min.—W. A. Kellerman and F. M. Surface.

20. Further experiments with the Cocklebur. 8 min.—E. E. Masterman.

21. The introduced species of *Lactuca* in Ohio.—8 min.—A. D. Selby.

22. Gradations * between *Verbena stricta* and *Verbena angustifolia*. 5 min.—Thomas A. Bonser.

23. New plants for the Ohio Catalog. 8 min.—A. D. Selby.

24. Observations on the origin of forest belts in Clay county, Kansas. 5 min.—John H. Schaffner.

25. A report on the Revised Catalog of Ohio Birds. 20 min.—Lynds Jones.

26. The summer birds of Lake Erie's Islands. 10 min.—Lynds Jones.

27. Perverted Benevolence. 20 min.—Gerard Fowke.

28. Notes on *Anthurus borealis* and *Erysiphe graminis*. 2 min.—W. W. Stockberger.

29. Birds observed at Wooster during the fall of 1901. 10 min.—Scott Harry.

30. Some aspects of plant growth as illustrated by methods of watering. 10 min.—W. J. Green.

Other topics for discussion:

1. Shall we continue field meetings?

2. What places of interest to scientists or to the general public are in need of protection by the State?

3. In what manner may the Academy become more serviceable to the scientific interests of the State.

Organization of Agricultural Students.

There is a movement on foot to effect an organization of students from the different Agricultural Colleges of the country. This movement started from the Iowa Agricultural College, and the first meeting will be held in Chicago during the International Live Stock Show. Each of the different Agricultural Colleges has been requested to draw up a constitution and by-laws suitable for

such an organization, and at a business meeting to be held on Wednesday morning, December 4, the best constitution and by-laws of those submitted will be adopted and a permanent organization effected. On Wednesday evening, December 4, a literary session will be held in the Assembly Hall of the Executive Building. President Spohr of the International Live Stock Association will deliver the address of welcome, and C. C. Poindexter will represent O. S. U. and give the response. The program will consist of addresses, papers and music. The object of the organization will be to bring the agricultural students of the country into closer touch and co-operation and to help to advance the cause of agricultural education in the United States.

Program of the Thirty-fifth Annual Meeting of the Ohio State Horticultural Society, held at the Auditorium, Lancaster, Ohio, Wednesday, Thursday and Friday, December 4, 5 and 6, 1901.

Wednesday, 10 A. M.

Arrangement of Exhibits.
Renewal of Memberships, etc.

Wednesday Afternoon.

Appointment of Committees.
Reports of Ad Interim Committees.
"Fruits at the State Fair"—F. H. Ballou, Newark, O.

Wednesday Evening.

President's Address—By President Miller.

"Our Birds"—N. C. Marion, Amanda, O.

"Flowers and Flower Growing for the Amateur."

"The Timber Trees of Ohio and the Present Demand for Wood"—By Prof. W. R. Lazenby.

Thursday Morning.

Question Box.

"Forcing Head Lettuce"—C. W. Waid, Experiment Station.

"The Forcing House Industry"—Professor Thorne.

"Fruit Notes of the Year"—Professor Green.

"What Varieties of Apples Shall We Plant?"—Silas Courtwright, Lancaster, O.

"My Experience in Apple Culture in Central Ohio"—F. P. Vergon, Delaware, O.

"Apple Culture in Northeastern Ohio"—Dr. W. I. Chamberlain, Hudson, O.

Thursday Afternoon.

Question Box.

"How Shall we Combat the Codling Moth?"—Prof. W. R. Lazenby.

"Experiments with Crude Oil"—Professor Corbett, West Virginia.

Report of Committee on Vegetable Pathology, with Remarks on "Spraying Appliances"—Prof. A. D. Selby.

Report of Committee on Entomology—Prof. F. M. Webster.

Thursday Evening.

Music.

Report of Awarding Committees.

"The Outlook for Fruit-growing in Southern Ohio"—Lowell Roudebush, Nicholasville, O.

"Amateur Strawberry Culture"—Matthew Crawford, Cuyahoga Falls, O.

Civic Improvement.

Friday Morning.

Report of Orchard and Nursery Inspection.

Report of Committee on San Jose Scale Legislation.

Report of Librarian.

Report of Treasurer.

Report of Secretary.

Election of Officers.

Unfinished Business.

Final Resolutions.

The following premiums to members, by the society. All exhibits to be grown by the exhibitor:

Best Plate.	First.	Second.
Rome Beauty	\$1 00	50 cts.
Baldwin	1 00	50 "
Belmont	1 00	50 "
Ben Davis	1 00	50 "
Grime's Golden	1 00	50 "
Jonathan	1 00	50 "
Northern Spy	1 00	50 "
Weaver Sweet	1 00	50 "
Peck's Pleasant	1 00	50 "
Rambo	1 00	50 "
Red Canada	1 00	50 "
R. I. Greening.....	1 00	50 "
Roxbury Russet	1 00	50 "
Stark	1 00	50 "
Winesap	1 00	50 "
York Imperial	1 00	50 "
Best plate of apples, any variety, adapted to Southern Ohio, market qualities to rule...	1 00	50 "
Best plate of apples, any variety, adapted to Northern Ohio, market qualities to rule...	1 00	50 "
Best plate apples, dessert qualities to rule...	1 00	50 "
Best plate of pears, market qualities to rule...	1 00	50 "
Plate Anjou	1 00	50 "
Plate Angouleme	1 00	50 "
Plate Kieffer	1 00	50 "
Plate Lawrence	1 00	50 "
Plate of grapes, dessert qualities to rule.....	1 00	50 "
Display of pears.....	5 00	3 00
Display of grapes.....	5 00	3 00
Display of celery.....	3 00	2 00
Best and largest collection of varieties of potatoes, not less than five tubers of a kind..	3 00	2 00
Display of carnations..	3 00	2 00
Best display of roses...	3 00	2 00
Display of cut flowers..	5 00	3 00
Collection of varieties of apples	8 00	5 00
Display of decorative plants	5 00	3 00
Display of vegetables...	5 00	3 00

Best exhibit of house plants, not more than six, grown by amateur—first premium, 200 gladioli bulbs; second premium, 12 plants iris kaempferi. Offered by E. H. Cushman

John Larkum Sigrist.

Upon Monday, October 28th (just after the November issue of THE STUDENT had gone to press), the whole University was shocked and saddened by the news of the death of John L. Sigrist, a member of the University football team and a student in the Agricultural College.

Never in the history of the University has an accident cast such a gloom over the entire student body. The earnest, sincere and sunny disposition of Mr. Sigrist had won for him the friendship of every one who knew him. He was cut down in the prime of a vigorous life just as he was about to graduate and begin his life work. The beginning of his graduating thesis was on his table at the time of his injury in the football game with Western Reserve, Saturday, November 26th.

Tuesday morning, brief funeral services were held in the Chapel. President Thompson and Dr. Rexford spoke briefly of the life and disposition of the deceased athlete, after which the hearse bearing the remains was escorted to the depot by several hundred students. Beautiful floral tributes were received from the various student organizations of which Mr. Sigrist was a member, and also from Western Reserve University and the Ohio Medical University. Many tributes from individuals were also received.

The following Friday evening the Y. M. C. A. held memorial services at which Professor Hunt, from the faculty of the

Agricultural College; Captain Cope, from the Athletic Board; Mr. Poindexter, from Townshend Literary Society; Mr. F. A. Miller, from the student body in general; Captain Kittle, of the football team, and J. W. Chaney of the Y. M. C. A., spoke in behalf of these various organizations. Resolutions were read from nearly every student organization in the University, and from many sister institutions. These we cannot publish

the Gymnasium in memory of John Larkum Sigrist.

A Memorial—John Larkum Sigrist was born in 1873, being one of eleven children. His training preparatory to college was received in the district schools and in the Oberlin Academy. In the fall of 1897 he entered the College of Agriculture of the Ohio State University and has been in college continuously until his death, October 28, 1901, which



in full, but the following are the resolutions adopted by the general Faculty and by the students of the Agricultural College:

FACULTY RESOLUTIONS.

Resolved, That the Athletic Committee be authorized to receive contributions from trustees, faculty, alumni, students, and friends of the University for a suitable mural tablet to be placed in

resulted from an accident received while playing football.

As a student he was conscientious and faithful, cheerfully performing any duty assigned him. He would have graduated from the College of Agriculture next June and had selected as the subject of his graduating thesis, "The Influence of Rainfall and Temperature on the Production of Hay and Oats in

the United States." He was an active member of the University Y. M. C. A. He enjoyed robust health and delighted in college athletics.

He was compelled to rely on his own resources to meet his University expenses. Two summers ago he canvassed in Wisconsin and last summer in Oregon, thereby deriving sufficient funds to defray his college expenses during the past two years.

Personally he possessed a sunny disposition, was even tempered, modest, with a pleasant word for every one. These qualities made him a favorite with the students, and no one has ever been heard to say an unkind word concerning him. In contest on the athletic field he always preserved a cool head, a good temper, and a kindly manner. He stood for square, upright conduct in the classroom, on the athletic field and in contact with his fellow students.

The shock of his untimely death has stricken with poignant grief the hearts of all who knew him, and cast a pall of sadness over the entire University. We join in expressions of grief over his loss and tender to his bereaved father our heartfelt sympathy.

TOWNSHEND SOCIETY RESOLUTIONS.

Whereas, It has been the will of God to deprive us of our beloved fellow-student, John L. Sigrist, whose inspiring companionship and hearty co-operation in all things helpful to University life, won for him the esteem and admiration of all; be it

Resolved, That we, the students of the College of Agriculture of the Ohio State University, do heartily deplore his tragic fate, and do fully realize our great loss in the death of such an ardent co-worker.

Resolved, That we hereby make manifest our deep sympathy to the bereaved family and large circle of friends of the deceased.

Resolved, further, That a copy of these resolutions be sent to the home of our late fellow-student, also that a copy of said resolutions be published in THE AGRICULTURAL STUDENT and *The Lantern*.

T. L. WHEELER,
C. B. HOOVER,
C. C. POINDEXTER,
Committee.

Expert Judging of Sheep.

A prominent feature of the work in the agricultural class at the O. S. U. is the study of the various kinds and breeds of live stock, as to their origin, development,—also their form, features, and functions.

A part of the work is critical judging of individuals, brought before the class in the live stock room of Townshend Hall. The University farm and others near by furnish types of horses, cattle and hogs, but sheep must be secured from breeders in other counties chiefly. Greene county breeders furnished the sheep this year, with the exception of Shropshires, which were from Franklin county. R. D. Williamson furnished American Merinos and Delaines; J. C. Williamson, Oxfords; R. C. Watt, Southdowns; D. B. Watt & Son, Cotswolds; W. H. Cheny, Hampshires; Charles Foutz, Cheviots, and J. C. Price of Harrisburg, Shropshires. They were most excellent representatives of the several breeds, many of them prize-winning animals at leading fairs the past season.

H. P. Miller of Sunbury, O., conducted the instruction in judging. A score card is employed, describing the feature to be examined and giving the relative value of each. With an animal before the class, the instructor goes over it, pointing out what a typical animal should be and showing the method of

examination. The students are then put to work scoring animals. Score cards are given each and they are required to write out their reason for every deduction made. Thus careful, critical work is necessitated. There are thirty-two young men in the class this year, including two from the Argentine Republic, who were sent to our Agricultural College by their government, to equip them for like instruction among their own people.

Mr. W. F. Watt of D. B. Watt & Son, accompanied the sheep at the request of their owners. By his modest and genial manner he won the esteem of all associated in the work. While here, he was invited by a representative of the University of Tennessee to bring a similar group of sheep to that institution and conduct the instruction in judging.

Fair associations should avail themselves of the young men thus trained for their awarding committees.

Total Number of Students Increasing.

It will perhaps be of interest to our readers to know of the present number of students in the various colleges of the University as compared with the number one year ago.

In the College of Arts there is a total of 422 as against 450 last year, or a loss of 28. The loss has occurred in the freshmen and senior classes, while the sophomore and junior classes show an increase over last year.

The College of Engineering shows a larger gain in numbers than any other college, there being 580 as compared with 486 last year. All classes show a decided increase over last year.

The number of students in the College of Agriculture and Domestic Science remains practically the same as last year, the actual numbers being 149 and 145 for each year respectively. Of the

145 students of Agriculture registered this year, 49 are in the regular Agricultural course, 5 in horticulture, 21 in domestic economy, 3 specials, 2 graduates, and 60 short course students in Agriculture and Domestic Economy.

The attendance in the College of Law has decreased owing to the raising of the entrance requirements. There are only 175, as compared with 200 at this time last year.

The College of Pharmacy shows a material increase, there being 40 students this year, as against 32 last.

The largest percentage gain in any college is in the College of Veterinary medicine. Sixty-four students are registered in this college, as compared with 24 last year.

A summary of the last two years may be given, as follows:

College.	1900	1901
Arts	450	422
Engineering	486	580
Agriculture and Domestic Science	149	145
Law	200	175
Pharmacy	32	40
Veterinary Medicine	24	64
	1341	1426
Names counted twice.....	10	11
Total	1331	1415

In 1900 there were 33 graduate students in all colleges. In 1901 there are 43, which indicates that the University is coming to be recognized as a post-graduate school.

There are 210 young women in attendance this year, as against 239 in 1900.

While some colleges have lost in numbers others have gained, and the total gain for the University has been 116 so far this year. While this is not as large a gain as was expected, yet the new students who will register later in the year will undoubtedly bring the

number up to nearly 1600 for the entire year. This shows a healthy growth and gives no reason for complaint.

A Visit to a Beet Sugar Factory.

It was my good fortune to be permitted to visit one of the largest beet sugar factories in this country, during the sugar-making season of last year. The factory is located at Lyons, Wayne county, New York, upon the New York

to the rear of the main factory containing a large lime kiln for the preparation of lime and carbon dioxide, both of which are extensively used in the process of manufacture.

The beets as they arrive at the factory by rail and wagon are unloaded into the great beet shed (see Plate 2), 400 feet long and 80 feet wide. This shed contains two V-shaped bins on either side of a driveway and extending the entire length of the shed. The wagons are

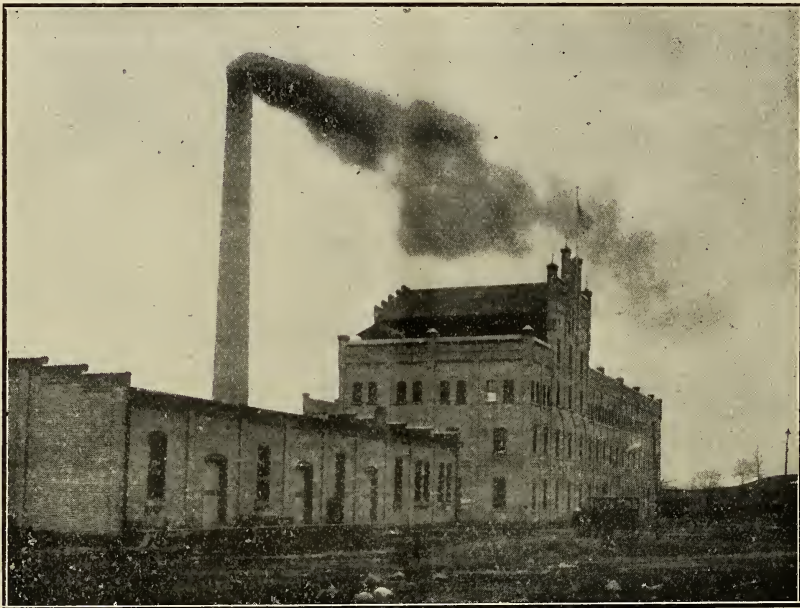


Plate 1—Beet Sugar Factory at Lyons, N. Y.

Central Railroad and the banks of the Erie canal. This is a happy location in that it gives splendid transporting facilities,—one of the most important elements of success in any manufacturing industry.

The main factory (as seen in Plate 1), is 260 feet long, 80 feet wide, and 80 feet high at its highest point. To the left of the picture is also shown the large storage room, and in the rear may be seen the large smokestack rising from the power house. There is also a large wing

unloaded from this driveway, while the cars are unloaded from either side of the shed. In the bottom of each bin and extending its full length is a flume into which the beets are permitted to drop by raising the short boards which serve as a covering (Plate 3). Through the flumes the beets are carried by a moderate flow of water to a large receptacle beneath the washing machine. In the bottom of the flumes at regular intervals are placed boxes into which settle all the stones and dirt loosened by the running water,

while the beets float over. The beets are also unloaded direct from the canalboats by means of a steam derrick and carried direct to the factory through a separate flume.

In the factory the beets are lifted by means of a large drum-like wheel and dropped into the washing machine. Here by means of arms arranged spirally on a central shaft the beets are tumbled about, washed and carried along until they are thrown out of the washer onto a screen through which fall all the roots broken off in the process of washing.

loped edges. As the beets come down on these knives they are cut into shreds of varying length and triangular in cross-section, the sides being from one-fourth to one-eighth inches. This shape prevents settling into a compact mass and facilitates the circulation of water.

The cossetts, as the sliced beets are now called, are dropped into the diffusion battery. This is composed of twelve cells (large tanks holding several tons of sliced beets). After all the cells of the battery have been filled at the beginning of the season, water is turned into the



Plate 2—Beet Shed at Lyons Factory, in which there were stored over 4,000 Tons of Beets.

The beets next fall into an elevator, which carries them to the top of the building where they are dropped into a large scale pan weighing 700 pounds at a draught and registering and emptying automatically. The beets are emptied directly into the slicers from the scales. These slicers are simply large hoppers upon the bottom of which are a series of rapidly revolving knives having scal-

top of cell number one, circulates through the cossetts, passes out at the bottom of the cell and into the top of cell number two, and so on through the entire battery. When it is shown that enough water has passed through cell number one, it is turned off and number two becomes number one. Number one is now emptied into the cellar and refilled, becoming number twelve, and so

the circle continues from day to day throughout the season. The water is held at a temperature of 65°-80° C., varying with the conditions. This is one of the most important steps in the entire process. If the temperature is not manipulated just right and at the proper time there will be a loss of sugar either in the pulp or by inversion into glucose.

The liquid now has the color of vinegar and after measuring is mixed with unslacked lime in the lining tanks. Here the minerals present in the juice (largely

which the juice goes to the quadruple effect boilers, where it is boiled down to about 50 per cent. solids. The syrup is then bleached with fumes of sulphurous acid, which comes into intimate contact with every drop of the syrup as it is forced through a finely perforated plate. Again the juice must pass through the mechanical filters, after which it finally enters the vacuum pans where it is boiled to a grain.

The product is now known as masquitte and is composed of crystallized



Plate 3—Showing V-Shaped Bottoms of Bins and the Flume Carrying Beets to the Factory.

phosphates), and which prevent the crystallization of the sugar, enter into a chemical combination with the lime. The mixture now passes to the carbonation tanks, where carbon dioxide is forced through it, precipitating all lime and impurities in the juice in an insoluble form. This material is next removed by passing the juice through large mechanical filters, from which the juice comes transparent. The processes of mixing, carbonating, and filtering are repeated after

sugar and molasses. The masquitte is now dropped into the centrifugals in which the molasses is separated from the sugar particles just as milk is separated from cream in the milk separator. The sugar as it now stands on the sides of the separators is washed with blue water, which makes it a pure white. It is now dropped through the bottom of the centrifugals and by means of an elevator is carried up to a large revolving cylinder. The cylinder is raised at one end and the

sugar slowly moves downward passing over heated pipes until it comes out of the other end as dry crystallized sugar, and is carried by an endless belt to the storing house where it is barreled or sacked as the case may be. Only one grade of sugar is made,—pure white granulated.

There are three bi-products in the manufacture,—pulp, the lime from the filters, and the molasses. Of these the last is the most troublesome. It is rich in sugar which will not crystallize on

manufacture of rum, a large part of the molasses in this country being shipped to Germany for this purpose.

The pulp is used largely for feed, not for the actual food value it contains, but as a succulent food. The value of the pulp as a food is not yet generally appreciated by the farmers, and a great deal of it goes to waste.

The lime from the filter is rich in mineral matter and especially in phosphates. Here again the farmers do not appreciate the value of this bi-product enough

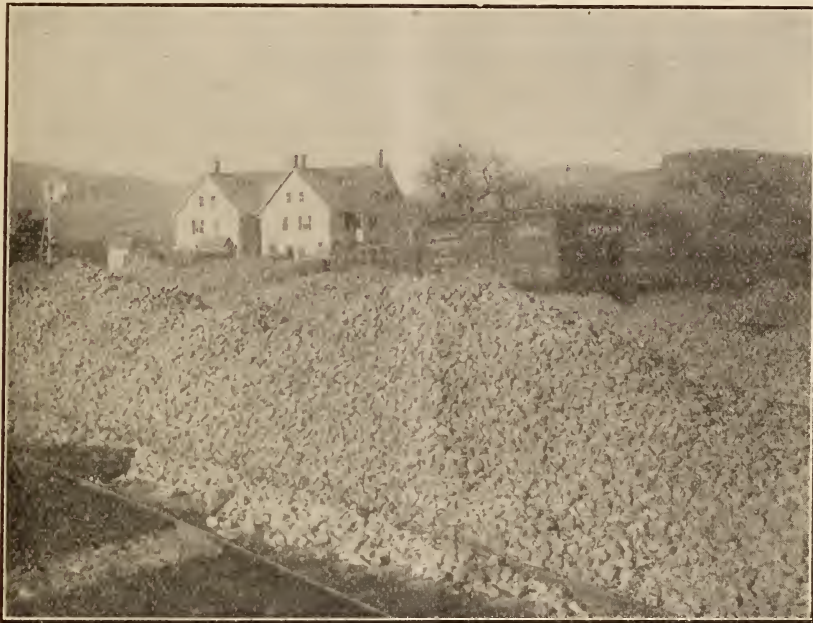


Plate 4—Overflow from Beet Sheds.

account of the impurities present. Formerly this product was held for a time in heated rooms and the separation repeated once and sometimes twice. In all modern factories the molasses is converted into sugar within the twenty-four hours by means of "Dr. Boch's patent crystallization in movement process," one of the recent inventions in sugar houses. The final molasses from which no more sugar can be extracted is run into a large tank and distilled in the

to haul it away from the factory. This will undoubtedly be a source from which the beet grower will get a large part of his fertilizer in the near future.

Not all the sugar in the beets can be recovered. Beets having from 12 to 14 per cent. sugar, yield from 170 to 180 pounds of sugar per ton. The daily output of this factory is from 85,000 to 90,000 pounds, which means that on an average of 500 tons of beets are consumed every twenty-four hours. The

making season begins the first of October and lasts until the first of February, during which time the process is never stopped.

The State of New York gives a bounty of one cent per pound on all refined sugar produced from beets, provided the factory pays the farmer \$5 per ton for his beets. This arrangement enables the farmer to secure more than the average price paid in the United States, and at the same time leaves the manufacturer a sufficient margin to encourage him in the investment of his capital.

The beets are drawn from a radius of 100 miles around the factory, both by rail and canal, and strange as it may seem the manager said that the beets could be laid down cheaper by rail than by canal. The farmers agree to grow so many acres of beets which are received at the factory irrespective of sugar content or coefficient of purity. This means that the possibilities of the region have been well tested and the factorymen know just about what to expect. Also the crop is new to the farmers and they must be taught how to grow it. When this has been accomplished and a constant supply of beets guaranteed, they will undoubtedly be bought on the basis of sugar content and coefficient of purity, just as milk is now bought on a basis of fat and solid content.

The new industry promises much to those regions in which the conditions of climate and soil are favorable to the growth of the beets. The New York farmers were getting 10 to 15 tons per acre which was netting them from \$15 to \$40 per acre. It not only affords a new cash crop for the farmer, but also offers a profitable investment for capital.

New factories are springing up all over the country, and there is here an open field for young men who will fit themselves for factory managers, or chemists. Upon the fidelity of the chem-

ist in charge of the "control" work the success of the factory depends in a large part. Limestone, fuel, the beets, pulp, the juices at various stages of the process, all must be analyzed by the chemist.

Realizing these facts some of the agricultural colleges have contemplated the advisability of adding a "Sugar Course" to the regular curriculum in order to fit men for the increasing number of positions open along the line. The beet sugar industry has come to stay, for as Professor Roberts says: "The conditions for sugar production are just as favorable in this country as in Europe and the people are coming to realize the enormous price they have been paying for imported sunshine." V. H. D.

From Cow to Customer.

The subject of sanitary milk is one that should command a great deal of attention, for milk and milk products are an important part of the dietary of civilized people. Yet the subject is never thought of from a scientific standpoint by the majority of the people. However, a few of the more thoughtful ones are becoming interested along this line.

The Department of Agriculture of the Ohio State University has put into practice the scientific methods of handling milk to produce what is known as sanitary milk.

The herd consists of about forty cows, mostly Shorthorns, Holsteins, and Jerseys.

Much could be said about the feed and methods of feeding, but space will not permit.

The cows are placed in the barn in whitewashed stalls, where they are daily brushed and cleaned. The milkers wear white suits and have damp cloths, to wipe the cows udders, which removes any loose dirt that might fall into the

pail. The first two or three squirts from each teat are milked on the ground as germs get into the end of the teat and would otherwise be milked into the bucket.

As each cow is milked the milk is taken to a room apart from the stable, in which is fitted up a Star Cooler. Cold water runs through this cooler and after the milk is weighed and recorded, it is poured into a tank through a strainer and runs over the cooler into another strainer, and into the can.

While the cows are being milked the atmosphere in the stable is kept as free from dust and odor as possible. The cows are never fed until after milking, and this is not done by the milkers.

After the milk is placed in cans it is hauled to Townshend Hall in a hand cart, where it goes through the process of separating, standardizing, and bottling.

It is first weighed and then emptied into a vat and a sample taken, which is tested to find the per cent. of butter fat. From the vat it goes into the separator, which not only separates, but purifies it, taking out all the dirt, so that there is no sediment left in a bottle of milk after standing for hours. By a simple method of figuring the proportion is found by which to mix the milk to five per cent.

The mixed milk is placed into a tank which is arranged to fill four bottles at a time, the bottles being placed in a tray which runs on a track under the tank. In this manner the milk can be bottled very rapidly. It is put in quart and pint bottles which are capped and placed on a corrugated iron table and washed with clean water. They are then dried with a towel and placed in cases and the milk is ready for the customer.

The bottles and utensils in the laboratory are washed and placed in a steam chest and live steam turned on which thoroughly sterilizes them.

The floor is made of white tile and is scrubbed twice a day. In fact everything is kept as clean as possible. In this way the O. S. U. Dairy has gained a reputation which other dairymen envy. Those who wish to see how clean, healthful milk is produced are invited to inspect its methods.

No one after seeing the way the milk is cared for would hesitate about using it. Several persons after passing through the bottling laboratory have said they did not blame the people for wanting O. S. U. milk, and that it was well worth the price.

When dairymen come to recognize that the secret of good milk is cleanliness, then will the dairy industry be of far greater importance than it is to-day.

T. L. WHEELER.

Why Agricultural Graduates Sometimes Fail.

During the past two or three years the *Review* has often commented on the demand for farm managers and has repeatedly stated that it was impossible as yet to supply the call for competent farm help. Many of the graduates of the school have thought that an injustice was done them when they were not recommended for some of the available positions which they thought they were competent to fill. That there is something more than a recommendation necessary for the fulfillment of such a position is shown by the following letter from a person who had employed a man that was well enough educated and who was thought to be responsible. The letter is published not to show up any particular man, but with the thought that it may be of use in illustrating to other young men what is expected of them by their employers. It will also explain the reluctance sometimes shown when recommendations are asked for by those

who are looking for something easy. The names used in this case are fictitious, but the letter is one written by a well-to-do farmer in Minnesota:

"Dear Sir: Your letter of August 21 was duly received and what you say in regard to Mr. Swell noted.

"I beg to say that I think you greatly over-rate Mr. Swell and that the sooner you cut loose from him or call him down from his lofty perch the better will it be for him and for you. Mr. Swell is not a competent farm hand even when the proprietor is about to run things; much less is he competent to take charge himself.

"While here he helped thresh at four different neighbors and gave satisfaction at none of them, some said he was lazy, others that he had the big-head so badly that he could not learn anything. As I said in my first letter, Mr. Swell is no stockman. I fail to find that he has the remotest sympathy with any kind of stock. He don't care enough about animals to be kind to them. With cows he is a slow and rather dirty milker; while here he never asked a question about the cows; he hadn't the remotest idea when any particular cow last freshened, when she was due to freshen again, or if she had been bred at all. He made no effort whatever to get acquainted with the herd in a way that would fit him to feed them intelligently. To be sure, I had not given him charge of the feeding, but I expected him to cultivate an acquaintance with individual cows so as to feed them properly when he was given charge.

"I give you one of several of his blunders: We have a small pasture near the barn where we let the cows run nights. There is a corn field alongside of this pasture and we had been throwing over green corn into the pasture every night for the cows, usually after milking. One night a week ago Mr.

Swell threw the corn over before milking while the cows were in the barn, but instead of shutting the young stock into the yard, he let them come into the pasture and they followed him right up and stripped the corn off as fast as he threw it over, and ate the better part of the fodder so that when the cows got out there was left only the coarsest part of the fodder. The following morning he made fully as bad a break. The gate into the lane leading to the lower pasture had been left open and by the time we had finished milking all the cattle except four or five cows had gone down into the lower pasture. Swell threw all the corn over to these four or five cows and then went down to the lower pasture three-quarters of a mile away and drove up the rest of the cattle to view the remains.

"As to hogs, he fed them as though he had never fed a hog before. The following instances will give you an idea of the interest he took in the hogs. Soon after Mr. Swell came we separated twelve young boar pigs from the remaining fifty-two and put them in a separate pen which had a rape pasture adjoining. Last Tuesday night the twelve boars all got out and I got them all back except one which got in with the other lot of pigs; three days later Swell discovered a boar pig in with the large lot of pigs and inquired where it came from. In the meantime he had fed these young boars three or four times and had never noticed that there were but eleven where there should have been twelve.

"Again last Friday about an hour after Swell had fed them, I took a party out to show him the pigs and sell him a boar. I found a pig weighing seventy-five pounds or more in the yard dead, within thirty feet of the feeding trough and in plain sight. The pig had been dead some time as it was cold and stiff

and fly blown. Swell had not noticed it at all.

"Again, I have sixteen old brood sows that I am holding over and getting in shape to breed in November for early pigs. About a week ago I engaged a boar—couldn't buy him—to breed them, paying \$15 for the use of the boar, all of which I had explained to Swell. Last Thursday night one of my own old boars that has been at a neighbor's for two months past, broke out and came home and got in with my old sows. He is related to all of them. The next morning when Swell was feeding them I happened to get a sight of the old hogs and I saw at once something was wrong from their behavior, so I went out and that there were seventeen instead of sixteen or that an old boar was running with sows I didn't want to breed until November.

"If I hadn't been home, he would probably not have noticed the old boar until he had bred the whole herd and been several hundred dollars damage to me.

"I give you these instances not to find fault with Swell, for I have not the least thing against him personally, but to show you how purely incompetent he is—how indifferent.

"You make a mistake, in my opinion, when you encourage him to stick to farming. He'll never make a farmer in a thousand years; he is dreaming of something big that he might do if he had the chance, and hasn't the stuff in him nor the patience to master the little details of farm work that are the foundation of all the big things."—Henry Prudence in *The Farm Students' Review*.

Book Reviews.

THE AMERICAN TROTTING AND PACING HORSE, by Henry T. Coates. Henry T. Coates & Co., Philadelphia; 148 pp.; 12 mo.; cloth; 75 cents.

This book is the latest book on the subject published, and contains many valua-

ble suggestions to horse trainers as well as owners. It contains a short history of the American trotting and pacing horses, together with Tables of Pedigrees of Famous Horses, Useful Hints, Suggestions and Opinions on Training and Conditionings, Rules for Track Laying, etc., by Henry T. Coates; The American Trotting Turf in 1899 and 1900, by A. M. Gillam, and What to do Before the Veterinarian Surgeon Comes, by George Fleming. The book besides treating of driving horses, gives a condensed history of the best horses in this country, with mention of their best performances. All lovers of horses will find this little book interesting and instructive.

FRUIT HARVESTING, STORING, MARKETING. A practical guide to the picking, sorting, packing, storing, shipping and marketing of fruit. By F. A. Waugh, cloth, 250 pp., amply illustrated. Orange Judd Co., New York. Price, postpaid \$1.

The fruit grower has two separate problems to solve: First, to grow the fruit, and second, to sell it. Every man who has tried it has found that the second of these problems is fully as difficult as the first. How to get money out of fruit is a question fully as urgent as how to get the fruit. There have been many fruit books written, but everyone knows they are all on the subject of how to grow fruit. At most there is a paragraph or a half chapter on fruit marketing. The great question of selling fruit has remained practically untouched, and this is the field now occupied for the first time by Professor Waugh's book on fruit harvesting, storing and marketing. It is a subject on which fruit growers will be delighted to have some information.

The subjects covered by this book are the fruit market, fruit picking, sorting and packing, the fruit package, and fruit

storage, with a large appendix giving useful statistics of the fruit trade, fruit package laws, information concerning commission dealers and dealing, etc., etc. The important subjects of the fruit package and fruit storage by refrigeration, ventilation and mechanical means, are especially well treated.

The subject has been treated strictly from the standpoint of the fruit producer. The commission business, for instance, is thoroughly and fairly discussed, and the commission men can hardly help but be pleased with the advice given, yet it is all plainly directed to the benefit of the fruit grower. Evaporating and canning are handled in the same way—not by telling how to run a canning factory or a commercial evaporator—but by explaining those points which are of interest to the man who grows the fruit. The whole subject is tersely, plainly put and adequately illustrated. It is a book which everyone can read and enjoy, and which no fruit grower, large or small, can do without.

FARM POULTRY, by George C. Watson, Professor of Agriculture in Pennsylvania State College. The MacMillan Co., New York, 340 pp., copiously illustrated; cloth. Price \$1.50.

This book is one of the latest of the Rural Science Series, edited by Prof. L. H. Bailey, and is in every way up to the standard of the books of the series previously published and which have become so well known. The subject is presented just as a good business man would approach it. First the facts concerning the present status of the industry and its possibilities are given, followed by a clear and perfectly impartial discussion of the merits and demerits of all kinds of poultry and their various breeds and varieties. The buildings for fowls, location, plan, construction, internal arrangement and yards, receive due consideration, together with the problems of feeding and

the preparation and marketing of the products. A chapter on Diseases and Enemies rounds out the treatise, making it a complete guide in every way for the prospective or practical poultry grower.

THE MAKING OF A COUNTRY HOME, by J. P. Mowbray. The Doubleday, Page & Co., New York; 258 pp. Price \$1.50, net.

The love of nature and the yearning for things out of doors seems to be common and inherent to the human heart. There is a marked movement from the city countryward, especially among men who have passed the meridian of life.

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D'RI AND I, by Irving Bacheller, author of Eben Holden. The Lothrop Publishing Co., Boston. Price \$1.50.

Perhaps none of the late books of fiction have attracted more attention and reached a greater sale than Eben Holden, by Irving Bacheller, and has well been termed "the most American of recent novels." D'RI and I by the same author, is a book similar in many respect yet pronounced even superior by many able critics. It is a border tale of the second war with the British and the scenes are laid in the same north country as was depicted in Eben Holden, including also the French domain of Canada. In D'RI Mr. Bacheller has created another character equally interesting with "Uncle Eb." The story is full of life, action, human nature and romance, and commends itself to every reader of high class fiction.

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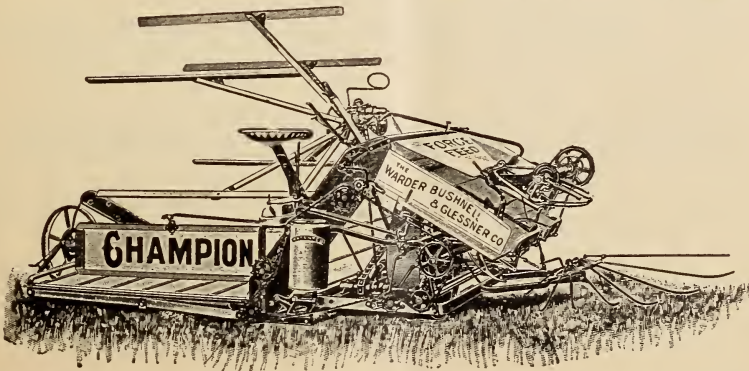
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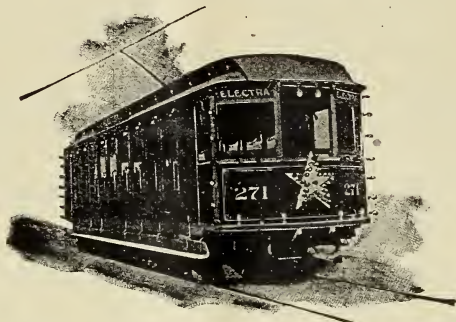
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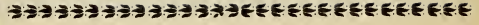
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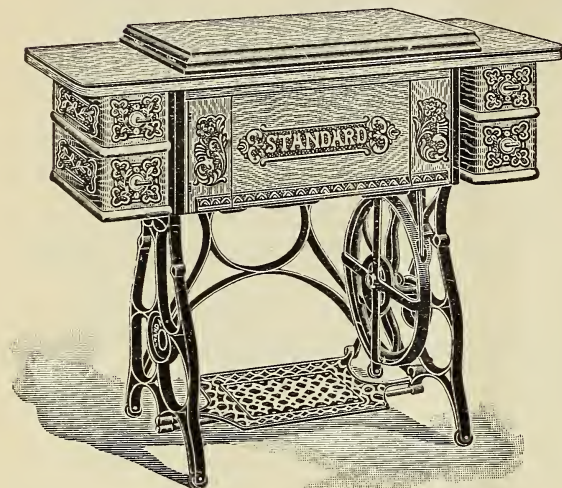


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